OSHA Directives
CPL 2-2.31 CH-1 - Removal of Obsolete Sections

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Subject: Removal of Obsolete Sections

A. Purpose. This notice transmits page changes which remove sections that contain policies and procedures superseded by guidelines set forth in the Field Operations Manual (FOM), OSHA Instruction CPL 2.45A.

B. Scope. This notice applies OSHA-wide.

C. Action. Replace existing pages with the attached CH-1 pages as listed below: Existing Pages Replacement Pages

I-13 and I-14 I-13 and I-14

III-1 through III-6 Deleted

IV-1 through IV-15 Deleted

D. Significant Changes. The instruction will be totally revised and reprinted at a later date. In the interim, the following sections are removed:

CPL 2-2.311, January 16, 1981: Chapter I, paragraph H. Citations, pages I-13 and -14; Chapter III, Guidance for Citing Permissible Exposure Violations, pages III-1 through III-6; and Chapter IV, Recommended Grouping and Classification of Violations, pages IV-1 through IV-15.

E. Background. A decision was made at the time the FOM was revised to incorporate all policies and procedures of a nontechnical nature into that manual. When FOM was published, numerous changes were made to existing health policy. These changes made the procedural sections of the instruction obsolete. To avoid confusion for directives users, it has become

necessary to remove inapplicable sections from the instruction. The remainder of the instruction is still in effect until the directive has been totally revised and reprinted at a later date.

John B. Miles, Jr., Director Directorate of Field Operations

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Chapter V

PLANT INFORMATION OBTAINED DURING WALKAROUND: PICKING AREA

A. Purpose. This chapter supplements Chapter 1, E., of this manual by showing an example of the sort of information which may be obtained during the walkaround.

B. Scope.

1. This chapter presents the information obtained and the plant layout sketch made during a hypothetical walkaround to evaluate an employer's monitoring program in a picking area. The layout sketch is Figure V-1 of this manual, and frequent references will be made to it in this chapter.

2. This information will also serve to develop an OSHA sampling strategy, if necessary, and to evaluate the employer's compliance program.

3. The information content obtained during an actual walkaround may vary greatly from that.shown here. The professional opinion of the OSHA industrial hygienist conducting the inspection will thus play an important role.

NOTE: An industrial hygienist who is very familiar with textile operations may not need to document this information during the walkaround, hut may wish to do it during the sampling portion of the inspection.

C. Picking Area. The hypothetical picking room is located on the west end of the second floor of the building. It is separated by a wall from the carding room, but the doorway between the two rooms is usually open. The floor space of the room is approximately 40 feet by 55 feet. (See Figure V-1.)

D. Picking Personnel.

1. A single supervisor has responsibility for both the picking and carding areas. The supervisor spends about 2 hours per day in the picking room.

2. Four employees work in the picking room:

a. Two of these employees function as picker operators.

b. One operates the garnett.

c. One works as a mechanic.

E. Picking Operations. There are five different types of machinery operations that go on in the picking room.

1. The Fiber Collection Hopper and Picker-Feeder Conveyer. Fibers are blown pneumatically through ducts from the opening room and into a feeder-hopper located in the picker room.

a. Normally, according to both a management representative and the picker operator, the feeder-hopper and picker-feeder conveyer do not require operator attention.

b. Occasionally fibers will become clogged or trapped at various locations along this process flow, and it is necessary for one of the picker operators or other employees to work on the feeder line to free the clogged fibers. These intermittent work operations may occur 5 to 10 times during each work shift.

c. Tending to the feeder line is usually done by one or both of the picker operators, unless the problem is major and they require assistance. About 5 minutes per day per operator is spent at this task.

2. Pickers.

a. There are six pickers in this area- Since the pickers are fed automatically by the feeder conveyer system, the operator's primary responsibility is to doff the pickers.

b. The two picker operators usually work as a team and remove the laps from the end of the pickers, weigh them on a balance, and then place them onto racks for intermediate storage and transport to the card room.

c. The picker operators have some free time when they are not required to be involved in the actual doffing operation. During this time the operators usually position themselves out in front of the pickers where they can observe their operation. This is illustrated as "X1" and "X2" on Figure V-1.

d. Both operators also spend some time cleaning around the machine.. The areas covered by the picker operators are designated by crosshatching on Figure V-1.

3. Garnetting of Drawing and Roving Waste.

a. One operator is responsible for the operation of the garnett. (Note that this plant is unusual in that it has a garnett in the yarn manufacturing area.) The operator spends most of the time taking sliver or roving out of transport baskets and loading it onto the input conveyer to the garnett. This is illustrated as "X3" in Figure V-1.

b. The garnett operator is also responsible for sending the garnetted fibers back to the opening room via a vacuum tube located in the opening room.

(1) The garnett operator wheels a large box, in which the garnetted fibers are collected, over to the area of the card room where this vacuum tube opening is located.

(2) He then removes one side of the large box so that the fibers either fall or can be raked onto the floor.

(3) Using the broomstick-like pole, the fibers are then poked up to the entrance of the vacuum tube, where they are sucked back to the opening room.

c. The garnett operator thus spends about 4 to 6 hours of his work shift feeding the garnetted fibers back to the opening room, and the rest of the time cleaning up the general area of the garnett machine.

OSHA Instruction CPL 2-2.31 JAN 16 1981 Office of Compliance Programming

4. Reworkable Card Waste Hopper.

a. The card room employee responsible for card stripping usually brings baskets of reworkable card waste into the picker room and dumps it into the feed hopper.

b. The picker operators then turn the hopper mechanism on and off to feed various amounts of reworkable waste into the picker process feed line.

c. This reworkable waste feed hopper does not have an employee tending it on a continuous basis. It may, however, be a source of dust in the picking room.

5. Dust Control. Despite enclosures and hoods that have been instituted, the picking area is visibly dusty. Along the feed conveyer, the doors of the enclosure are often left open. The dust control system is installed on the pickers as follows:

a. Various hoods and collection devices over the pickers and the garnett collect dust and blow it into a filter room.

b. The air cleansing system contains a large cylindrical filter through which the air from the local ventilation system must pass, filtering out the dust before the air is returned to the room.

c. Two or three times a day the picker room mechanic sweeps up air cleaner waste that is dumped onto the floor, puts it into a basket, and transports it to the vacuum collection tube (located in the carding room) leading to the opening room.

d. At the vacuum collection tube the waste materials are dumped on the floor and swept into the vacuum tube inlet to send the waste particles and fibers back to the opening room.

e. This waste fiber is used in the batting that is used for mattress manufacturing. The mechanic has a high potential for dust exposure while

gathering this waste and sending it back to the opening room by sweeping it into the vacuum tube opening.

F. Shift Work. The picking room normally works only one full shift, although it occasionally works 4 hours on the second shift. Normal work shift hours are 7:30 a.m. until 3:50 p.m. The pickers are often shut down for 30 to 60 minutes for lunch, which starts at about 10:30 or 11:00 a.m. Generally, the garnett is shut down while the operator goes to lunch.

G. Electrical Outlets. There are six electrical outlets located in the picker room, which are adequate to allow sampling of this area.

H. Employer's Measurement Results. The employer used six vertical elutricators at the locations shown in Figure V-1 by . Employee exposure was determined by averaging six measurements, and assuming that all persons in the packing room had the same exposure. The following narrative need not accompany the case file, but is included here for the sake of example. The case file should contain copies of the employer's records.

1. Results of the employer's exposure data were as follows:

April 22, 1980 Micrograms/Cubic Meter

(Name), picker operator 1 377

(Name), picker operator 2 377

(Name), picker mechanic 377

(Name), garnett operator 377

(Name), foreman, picker/card 328

October 30, 1980

(Name), picker operator 1 331

(Name), picker operator 2 331

(Name), picker mechanic 331

October 30, 1980 Micrograms/Cubic Meter

(Name), garnett operator 331

(Name), foreman, picker/card 280

2. Because it did not seem reasonable that four workers should have the same exposure, the industrial hygienist obtained a copy of the raw data as follows:

Picker Room DATE Sample Location Concentration

4/22/80 A 522

4/22/80 B 296

4/22/80 C 40

4/22/80 C 406

4/22/80 D 353

4/22/80 E 300

4/22/80 F 389

10/30/80 A 497

10/30/80 B 315

10/30/80 C 425

10/30/80 D 324

10/30/80 E 205

10/30/80 F 225

3. Analysis of the employer's data would show the following:

(a) The values of the raw data are reasonable for a poorly controlled picking room. The range of values is also reasonable.

(b) Since some of the employees do not spend any time where some of the samplers are located,

the averaging of all the results is not appropriate.

(1) For the picker operators, locations B, C and D should be averaged. The picker operator's exposure would thus be:

4/22/80 352

10/30/80 354

(2) Location E is not useful. It should be moved to the vacuum opening.

(3) For the garnett operator, the exposure should be time-weighted: 7 hours at location A, and 1 hour at the new location E (near the vacuum opening).

(4) The mechanic's exposure should be calculated from all six locations. /

(5) The foreman's exposure should be time-weighted for time spent in the card room. The exposure for the picking room would be 2 hours at the average of all six locations.

I. Air Currents. The only air currents detected were inward movements from the cleaner card room. Arrows on Figure V-1 show the air flow. Additional ventilation information would be obtained during the sampling portion of the inspection.

Chapter VI

SAMPLING STRATEGIES

A. Purpose. This chapter presents several examples of sampling strategies developed for an inspection of a hypothetical textile mill.

B. Scope. These examples are only intended to demonstrate possible OSHA sampling strategies that will make the best use of OSHA resources while accomplishing the inspection goals. Other strategies that may be equally effective could be chosen. In any case, the examples will give only an idea of the strategy to develop. Professional judgment will be necessary to develop strategies for actual field situations. NOTE: It should be emphasized that these strategies are developed for OSHA compliance purposes only, and do not necessarily reflect the employer's sampling strategy.

C. Picking Area. This is the sampling strategy for the hypothetical situation described in Chapter V of this manual.

1. The two picker operators can easily be sampled with five vertical elutriators, located within the cross-hatched section of Figure V-1. The duties of these employees meet all the sampling criteria found in Chapter I of this manual.

2. Unlike most picking operations, these picking operators work as a team. Their exposure would therefore be the same. The sample results are:

OSHA Sample Results

Concentration Location Micrograms/Cubic Meter

#1 296 #2 372 #4 315 #5 355

3. To calculate the exposure during the time spent in the picking area, find the arithmetic average of the five sample results. The exposure would be 296 + 372 + 406 + 315 or 349 micrograms per cubic meter. _____ 5 4. To calculate the 8-hour TWA exposure, the time

spent away from the picking area must be considered. In this example, the only time spent away from the area is one-half hour spent eating lunch in a lunch room equipped with an air filtration system. Hence, we assume no exposure to cotton dust during this period. Also in this example the sampling duration was 6 1/2 hours, which, based upon professional judgment, provided results that were representative of the 7 1/2 hour TWA exposure in the picking area. Thus, taking into account the above facts, the 8-hour exposure would be $\frac{(349)(7.5) + (0)(0.5)}{8}$ = 327 micrograms/cubic meter.

5. This compares reasonably with the employer's values of 352 and 354 as calculated on page V-8 of this manual.

D. Carding Area.

1. Description. The carding area is located on the west end of the second floor of the old spinning building adjacent to the picker room. The east end of that same large area is devoted to drawing and roving. The drawing and roving area is not physically separated from the carding area, but from a supervisory standpoint the two areas are operated separately and are served by two different ventilation systems. The dimensions of the room are approximately 68 feet by 50 feet. Figure VI-1 is a sketch of the carding area.

2. Carding Personnel. Thirteen employees work in the carding area, in addition to the supervisor, who also has responsibility for picking.

a. Two of these 13 employees actually work in and adjacent room operating a Hollingsworth threadmaster. The threadmaster reworks waste yarn, separating it into fibers so that it may be utilized in the mattress manufacturing operation.

b. Four carding area employees work as card tenders.

c. Two carding area employees work as card mechanics.

d. Two carding area employees serve as utility men, filling in on any jobs where they are needed.

e. Two carding area employees work as card strippers.

f. One carding area employee works as a porter, doing clean-up work.

3. Carding Operations.

a. Card Tenders. There are 134 cards in the carding area. Each card tender tends approximately 34 cards, which amount to two rows of cards.

(1) The card tender places the laps from the picker room on the feed end of the card and doffs the cans of sliver from the doffer's side of the cards.

(2) Each card must be doffer about every 3 hours. The doffing operation takes just a few minutes, but the 34 cards in the card tender's control are ramdomly doffed as required.

(3) The card tender has time between the doffing operations to clean around the machines and to blow-down the machines, a process which is done once each shift. Typically, the blow-down operation is done shortly after lunch break.

(4) The card tender is responsible for blowing down the machines and leaning up on the doffer side of the machines. The hatchmarks on Figure VI-1 indicate the working area of one card tender.

b. Card Strippers. Dust and lint collection systems are installed on all of the cards, and the collected dust and lint from each row of cards goes to Pneumafil collection houses.

(1) One of the two card strippers is responsible for cleaning these Pneumafil collection houses. This operation is done once each shift, and usually is done the first thing in the morning.

(2) The other card stripper is responsible for cleaning the waste out from under the cards. The waste from the front of the card usually is cleaned once each shift. Usually, this operation is done the first thing in the morning, and completed by 10:00 to 10:30 a.m. The card stripper uses a rake-like device to rake the waste out from under the cards, puts it into a basket, and later in the day, sends the waste through vacuum collection ducts back to the opening room.

(3) During the rest of the day both card strippers do cleaning on the cards. Both card strippers have the possibility of very high dust exposure when they are cleaning the waste or collecting the waste from the cards, or when they are sweeping it into the vacuum collection duct for transport to the opening room.

c. Card Mechanics and Utility Operators. The card mechanics and utility operators work throughout the card room and have no special station assignment. Their exposure varies dramatically from day to day.

d. Porter. The porter is responsible for cleaning the bathrooms and the back aisles of the card room. Exposure varies considerably depending on personal work practices.

e. Electrical Outlets. There are only eight electrical outlets in the card room. It may prove to be quite time-consuming to install temporary wiring cords from these outlets to

the areas where cotton dust sampling should be done to properly evaluate employee exposure. Because of the large size of the room, and the large area over which the employees move during their work shift, it will be necessary to run some temporary wiring more than 100 feet depending upon the sampling location. The location of the electrical outlets are shown as E Figure VI-1.

4. Sampling Strategy.

a. Employee Selection.

(1) Out of 11 employees in the carding area, only 4 have designated work areas. For areas cover large sections of the area. Most of the other employees duties that take them throughout the area.

(2) It will be most advantageous to sample the card tender. Because the carding area is large, only one tender could be sampled with five vertical elutriators.

b. Location Selection. The location selected is adjacent to the drawing area and near the electrical outlets. The vertical elutriators are scattered in the carding area worked by one card tender. The sampling locations are shown on Figure VI-1.

c. Exposure Calculations. The card tender's exposure is calculated by arithmetically averaging the five vertical elutriator sample results.

d. Other Employees.

(1) Often, it will be difficult for OSHA to the exposure of employees who throughout large areas of the plant. The employer, however, could easily move

the vertical elutriators throughout the plant from day to day to measure these employees' exposure.

(2) However, it has been noted that the card stripper mechanics and porter could have high exposure levels that depend upon their duties and work practices. To ensure protection for these workers:

(a) Review the employer's data to determine exposures.

(b) If the written work practice program required under 29 CFR 1910.1043(e) (3) (ii)(f) has been prepared, review it carefully. It must be prepared no later than March 27, 1981.

(c) While sampling, as one industrial hygienist monitors the instruments and the carding area being sampled, another should observe the duties and work practices of the workers.

(d) Evaluate this information to determine if there is compliance with the work practices required under 29 CFR 1910.1043(g).

(e) Based upon the observations, determine if the written work practice program is adequate.

E. Drawing and Roving Areas.

1. Description. The drawing and roving areas are located adjacent to the card room. The drawing frames are separated from the carding machines by an aisleway, but there is no physical barrier. Neither is there a physical barrier, other than an aisleway, separating drawing frames from the roving frames. These areas are approximately 70 feet by 76 feet in extent. They are illustrated in Figure VI-2.

2. Personnel and Operations.

a. Drawing. The mill has 28 drawing frames, each with two-position delivery. The frames are located in two long rows, extending from one side of the room to the other.

(1) Three employees work as frame tenders on these machines. One employee tends 9 machines on the first row, another tends 10 on the second row, and the third handles all of the remaining drawing frames.

(2) A second shift is conducted in the drawing area with two employees, each running 9 or 10 frames. Most of the blow down and major cleaning is conducted on the second shift.

b. Roving. The mill has 12 roving machines (or slubbers). One roving machine tender can operate two machines. A second shift is conducted in the roving area, and most of the blow down and major cleaning is conducted on the second shift.

3. Electrical Outlets. There are 14 electrical outlets in the roving area, located on roof support pillars. These should prove sufficient for OSHA purposes. However, some cords will have to be run for distances up to 50 feet.

4. Sampling Strategy.

a. Samplers are so arranged in the roving and drawing areas as to permit detailed sampling that accurately establishes individual personal exposure.

b. Sampler locations are selected to sample in retail the exposure of one drawing frame tender and one roving frame tender.

c. The layout drawing for these areas, Figure VI-2, shows the vertical elutriator sampling locations. Employee exposure is determined for the operators of the machines marked by cross-hatching.

d. Five vertical elutriators are used to sample the drawing machine operator, and five for the roving machine operator.

e. The inspection team consisting of two industrial hygienists spends 2 days sampling, each day concentrating on an area of the plant.

5. Exposure Calculations.

a. Drawing. The exposure of the drawing machine operator is calculated by averaging the five samples located in the employee working area shown in Figure VI-2.

b. Roving. The exposure of the roving machine operator is calculated by averaging the five samples located in the employee working area shown in Figure VI-2.

F. Spinning.

1. Description. The spinning room is one of the largest areas of the textile mill.

a. It includes the spinning machinery, and also winding machinery which is located on one side of the room.

b. The room contains 76 spinning frames, each with approximately 200 spindles, and 15 semiautomatic winding machines.

c. The spinning and winding areas are separated by a fairly wide aisleway, hut the same air handling and air conditioning system services the entire area.

d. One small area in the corner of this room is devoted to a waste reworking area where waste roving and yarn is torn apart to reclaim the fibers for reuse.

e. Figure VI-3 is a sketch of the spinning and winding areas.

2. Personnel and Operations.

a. Approximately 35 people work in the spinning frame area of the mill. The 76 spinning frames are divided into two areas, each managed by a foreman, and each foreman has approximately 15 employees under his direction.

b. The employees are responsible for spinning, doffing maintenance and cleaning.

c. The mill produces three different size yarns: 7's cotton count, 9.5's cotton count, and 11.5's cotton count.

d. When producing the coarser yarn (7's cotton count), a spinner usually is assigned to operate 6 spinning frames and a doffer to handle 12 spinning frames. When producing this coarser yarn, the frames generally must be doffed three times each shift.

e. When producing the finer yarn (9.5's and 11.5's cotton count), a spinner usually is assigned to operate 5 spinning frames and a doffer to handle 10 spinning frames. In producing the finer yarns, the frames typically must be doffed twice each shift.

f. The hypothetical spinning mill is considerably short on employees. Usually, a number of frames are not operating because of an operator shortage for that particular day. Utility men and maintenance men are often used as spinners or doffers to operate a full job or half a job, in an effort to keep as many frames operating as possible.

3. Electrical Outlets. There are four 110 volt electrical outlets in the spinning area, as shown in Figure VI-3.

4. Sampling Strategy.

a. The emphasis in spinning area sampling will be on attempting to collect a sufficient number of samples to evaluate the exposure of two spinners and one doffer working on frames.

b. Vertical elutriators are placed in the aisles where the workers spend their time. Since the operators move from one machine to the next, it is necessary to use several vertical elutriators to define the exposures. In this case, five elutriators are used.

5. Exposure Calculations. The exposure of one spinner is calculated by averaging samples from locations A, B and C, as shown on Figure VI-3. The exposure of the second spinner is calculated by the average of C, D and E. The exposure of the doffer is calculated by averaging all five samples.

G. Winding.

1. Description. This is the same as for the spinning area, given in paragraph F.1.

2. Personnel and Operations.

a. The winding area has approximately 15 winding frames and 20 employees. One foreman is responsible for all of the work in the winding area.

b. Each winding machine requires almost constant attention of an operator. The winding machines are semiautomatic, and the operator sits at a fixed location, places yarn bobbins in a magazine and removes yarn packages from a traveling conveyer.

c. The operator spends approximately 7 1/2 hours at this fixed location, and one-half hour correcting problems up and down the winding frame line.

3. Waste Reclaiming Area. The small waste reclaiming area located on the corner of this large room is actually an operation which is the responsibility of the card room supervisor.

a. The equipment in this area consists of feeder hoppers and two specially equipped cards.

b. Employees manually feed roving and yarn waste into the hoppers, remove the stock, and put it

in boxes for transport back into the process line. Two employees typically work in this area.

4. Sampling Strategy.

a. In the winding area, the operators remain relatively stationary. Vertical elutriators are placed near the job location.

b. For this example, three positions are measured at the locations shown on Figure VI-3 as "F", "G" and "H".

c. To measure the concentration while the operator tends to correcting problems down the line, two elutriators are placed in the aisleways near the machine at "I" and "J" on Figure VI-3.

d. It was decided that no samples would be collected in the waste reclaiming area during this hypothetical inspection, because the winding area seemed more important.

NOTE: A different sampling strategy could have been developed, using only three vertical elutriators in the winding area and two elutriators in the waste reclaiming area.

5. Exposure Calculations. For the winding operators, exposure would be time-weighted, as follows:

Exposure of 1st winder =

$$\frac{(7.0)(\text{Sample F}) + (O.5)(\text{Sample I}) + (0.5\ \text{lunchtime})(O)}{8}$$

Exposure of 2nd winder =

$$\frac{(7.0)(\text{Sample H}) + (O.5)(\text{Sample I} + \text{J}) + (0.5\ \text{lunchtime})(O)}{\frac{2}{8}}$$

Exposure of 3rd winder=

$$\frac{(7.0)(\text{Sample G}) + (O.5)(\text{Sample J}) + (0.5\ \text{lunchtime})(O)}{8}$$

Chapter VII

PROCEDURES FOR USING THE VERTICAL ELUTRIATOR

A. General Operation Procedures. In general, follow the procedures for sampling with the vertical elutriator, and the procedures for analyzing the samples, which are given in Appendix A of 29 CFR 1910.1043. Specific exceptions and additions are presented in this chapter. In the interest of continuity, a few of the sampling and analytical procedures described Appendix A are repeated.

B. Use of Professional Judgment. These procedures are good operating practices, but not the only procedures that will provide correct results. Minor deviations may not substantially affect the sampling results.

C. Instrumentation. Compliance samples shall be collected with the vertical elutriators (VE's), as provided in 29 CFR 1910.1043(d)(1)(ii) and elsewhere in the standard. OSHA has two types of vertical elutriators: one has a constant flow regulating device; the other maintains constant flow

by an orifice. Both are equipped with rotameters. Most of the instruments are electrically powered, but battery powered ones are available.

D. Flow Rate. Collect samples at 7.4 + G.2 liters per minute.

E. Filter Cassettes. The filter cassettes for vertical elutriator sampling are 3-piece and 37 mm diameter. The filters are 5 micron pore size, 37 mm diameter, and made of polyvinyl chloride.

F. Preparing for Sampling.

1. Obtaining Instruments. Not all Area Offices will be equipped with vertical elutriators. It may be necessary to borrow elutriators, through the Regional Office, from another Area Office.

2. Number of Instruments. For a typical textile mill, plan on taking seven vertical elutriators and four personal pumps on an inspection.

3. Transportation. Four vertical elutriators will fit into a compact size station wagon.

4. Preweighed Cassettes. Approximately 20 cassettes containing preweighed filters must be brought to the inspection for each sampling day. This will provide a sufficient number of cassettes and filters for operating 5 VE's and 2 personal pumps, and will supply the necessary blanks. Use the following procedures:

a. Weigh the filters according to the IHFOM, Chapter X, page 6. Do not, however, desiccate the filters. Report three significant figures.

b. The same person who preweighs the filter should also post-weigh the filter, using the same balance if feasible.

c. In addition to filter cassettes for sampling, approximately 10 percent of all filter cassettes shall be control blanks.

(1) Do not use these for sampling, but remove the caps at the worksite and immediately put them back in place.

(2) Post-weigh the filters after returning to the office.

(3) Calculate the weight change of the blanks.

(4) Average the weight changes of the blanks for the same area and shift.

(5) If the average weight change is positive--i.e., the average weights of the blanks increased--subtract this average weight change from the weights of the cotton dust samples; if the average weight change is negative, add this average weight change to the weights of the cotton dust samples.

G. Calibration Check.

1. Check the flow-rate calibration setting for 7.4 liters per minute using a 2- or 3-liter burette.

2. Perform the calibration check in the Area Office before the instruments are taken to the field, and when they are brought back after use. However, the vertical elutriator should not be used more than 2 weeks without a calibration check.

3. The following is the calibration check procedure:

a. Set up the vertical elutriator as if to sample with filter and cassette.

b. Secure the rubber stopper made for calibration checks into the elutriator body inlet.

c. Wet the inside of the burette.

d. Set up the burette in the ring stand.

e. Connect the tubing between the elutriator and the burette.

f. Allow the elutriator to run 1 minute before taking readings.

g. Take readings by timing the bubble with a stopwatch.

h. Take three readings and average them.

i. Record the data. H. Electrical Power. Refer to Chapter I, D. 3. through D. 8., of this manual.

I. Setting up the Elutriators in the Field.

1. Because of space requirements, vertical elutriators are transported disassembled. At the plant, reassemble the vertical elutriator where it is convenient. Assembly time is approximately 10 minutes per elutriator. If space can be provided by the employer, the vertical elutriators should be assembled at a central location and then carried to the sampling location. It is possible to carry the vertical elutriator throughout the plant while it is assembled.

2. For practical purposes, one person can carry only one vertical elutriator at a time. At the plant, the management may provide a hand cart to convey the instruments to the worksite.

3. Each industrial hygienist should know the sampling locations, and should place the vertical elutriator as designated on the plant layout sketch. All OSHA industrial hygienists at the plant must assist in setting up the elutriators.

4. If the vertical elutriator is carried while assembled, all parts must be rigidly secured. The filter must not be in the elutriator while it is being carried. The filter should be inserted after the vertical elutriator has been located at the sampling site.

5. If the employer can provide the space, the assembled vertical elutriators can be stored overnight in the plant (rather than disassembling the instruments each evening and putting them in the station wagon). Before transporting the elutriator at the end of the day, remove the filter and replace the cover caps.

J. Sampling.

1. After locating the elutriator and providing electrical power, run a clean, lint-free cloth through the elutriator body to remove any dust from the elutriator that may have accumulated since the last cleaning.

2. Obtain one of the three-piece cassettes. The cassettes must, of course, already have filters in them. Remove the top section and the small plug from the bottom section. Insert the cassette into the opening at the top of the vertical elutriator as is done for collecting a sample. Instead of collecting a sample, however, merely run the sampler 2 or 3 minutes, to assure that any extraneous dust that may have been left in the elutriator after the cleaning is flushed out.

3. Stop the sampler. Remove this cassette and insert another cassette for collecting the sample. Since the cassettes can be loosened by vibration, the cassette must be inserted securely and taped to the

vertical elutriator body using electrical tape to prevent leakage during sampling.

4. Secure the tubing to the pipe with tape, especially at the top where the weight of the tubing may cause a pinch at the cassette connection.

5. The following is a rough guide for changing filters during the sampling shift, depending upon the dust concentration.

Number of . Dust Concentration Changes Filters/Shift

LT 300 0 1 300 to 600 1 2 GT 600 2 3

6. When changing the filter, the vertical elutriator pump must be turned off because the filter may be ruptured while working under negative pressure.

7. The filter can be changed simply by tilting the vertical elutriator body. For convenience, one end of the tape for sealing the cassette can be stuck to the body of the vertical elutriator so that it will be handy to reach while holding the vertical elutriator in the tilted position.

8. Make checks on the operation of the vertical elutriator every hour. When checking the operation, lock to see if the cassette is taped down tightly, if all tubing is connected, and if the rotameter designates the proper flow.

K. Cleaning the Vertical Elutriator.

1. Clean the inside of the vertical elutriator body with a damp cloth each day after sampling.

2. Use a cloth or a brush to clean the dust from the pump motor and body each day after sampling.